# MARKETING, DISTRIBUTION AND CONSUMPTION OF FROZEN FISH IN ANYIGBA METROPOLIS OF KOGI STATE, NIGERIA (ID: 234)

By

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## Abstract

The study was carried out in Anyigba metropolis in central Nigeria to analyse the distribution, marketing and consumption of frozen fish. Twenty (20) retailers and 60 consumers were randomly selected for questionnaire administration. Descriptive statistics, marketing margin analysis, the gross margin approach to profitability analysis and regression analysis were used. Findings revealed that frozen fish trade was largely in the hands of young uneducated women and was profitable. It was also revealed that most consumers preferred *Ethmalosa fimbriata* (bonga fish) on account of its low price. The Market margin analyses show a good motivation for continuity in the business although there is need for caution in pricing as consumption of frozen food in the area was price elastic in the fashion of normal goods. Regression results revealed that increase in factors like amount spent on meat, price, income and transportation cost reduced the level of fish consumption while increase in years of schooling, family size and age were positively related to fish consumption. Patronage of Fish in the area appears to be high judging from the profitability level of the trade. Some of the problems militating against the trade include poor power supply, high storage cost and poor road network. Recommendations made include among others, improvement in power supply, encouragement of adult education so as to increase effectiveness of the trade and encourage consumption by consumers, and introduction of other species of frozen fish in order to increase consumers' choices.

**Key words: frozen fish, marketers, profitability, determinants, consumption**

## INTRODUCTION

In-take of animal protein in Nigeria is far below the required minimum level of 35g/day recommended by FAO. With a population of over 150 million, the annual per caput consumption of fish in Nigeria is 9.68kg. Reasons for the poor consumption of animal protein include high prices and income poverty [1]. Fish has been identified as a relatively cheaper source of protein especially in developing countries. Fish accounts for 20 percent of animal-derived protein in low income, food-deficient countries, compared with 13 percent in the industrialized countries and it is estimated that fish contribute up to 180 kilo calories per person per day [2].

According to [3], the demand for fish protein in 2007 was 2.66 million tons while domestic production was 0.6354 million tons. This deficit was said to be partly augmented by massive importation of about 740,000 tons frozen fish valued at 594.4 million USA dollars which is certainly a big draw-down on scarce foreign exchange. Government policies have continued to emphasize self sufficiency in the fishery sub sector. Estimated self sufficiency in fish production was 32.48% in 1985. It peaked at 50.2% in 1987 and staggered thereafter between 18.64% and 29.38% from 1989 to 1999 until it came to an all time low of 9.78% in 2000. As at 2004 it was 15.02%. It is believed that aquaculture has the ability to bridge the

supply demand gap in order for self sufficiency to be attained [4] - although this hope has been negatively impacted by certain policy summersault. For instance, according to Daily independent [5], Nigeria has become a major destination for imported seafood ever since the Government made a tariff reduction on all fishery products in 2001 from 25% to 5%. The European Union accounts for more than 70% of the Nigerian sea food supply while the US provides about 1% [6]. The massive potentials of a coastline of 853km, a 200 nautical miles Exclusive Economic Zone (EEZ), over 2,658 fish farms as well as 937 Dams and Reservoirs, 365 lakes and reservoirs and 687 ponds and floodplains totaling over 13 million hectares of water bodies [7] remain largely untapped.

However, sources indicate upward trends in production, trade and consumption of fish in Nigeria even though the demand-supply gap remains a big challenge to local producer. The level of production has received boost from increased demand [2,3]. The increase in demand may have been informed by income poverty – beef, goat meat, chicken and meat from wild source which are widely consumed in Nigeria are more expensive than most of the common fish species on weight basis. The annual per capita income is only about 350 USD. Also, Fish has very low fat and calories and therefore useful for dieting.

The fisheries sector of the Nigerian economy employs a tangible number of Nigerians. Both the primary and secondary sectors of the Nigerian fisheries industry employed about 26.5 million Nigerians as at 2008. The female folk involved with processing and trading account for 73% of those employed in the sector [3]. The figure has been increasing. The upward trend in the volume of fish trading stems from the upward trends in the production and consumption. The marketing of fish has been a lucrative business for Nigerians especially those found along the riverine areas. Many inland business people have also taken this business as a means of livelihood. Traded forms of fish include smoked fish, frozen fish among others. Imported frozen foods are usually shipped to Apapa-Lagos, port-Harcourt, and Warri where they are inspected and passed through customs. After clearance, they are transported from these coastal cities to cold storage warehouses in urban centers across the country. They are then distributed to designated wholesalers who feed the retailers. About 96% 0f fish sales occur at open stalls in market places and along streets and roadsides while the remainder goes to hotel and eateries [6]

**Problem Statement**

Anyigba town in Dekina local government of Kogi state is strategic as a university town and an economic hub of Dekina and surrounding local government areas. It is also the most prominent and fastest growing town in Kogi east senatorial district. Anyigba had an estimated population of 56,000 in 2000 and about 71,323 in 2006 [8]. Based on the growth rate of 2.5%, the population of the town was estimated at 78,726 in 2010. The town is however experiencing a high level of immigration due to the high level of demand by the university community for supportive entrepreneurial activities. The population is therefore likely to be much higher than that obtained from the normal range of estimation. Recent immigrants to Anyigba town also consist of individuals who came in search of job opportunities and students of the university from other parts of the country. The rising population indicates the increasing pressure on the Environment's limited resource base. It also means that economics activities in the town are on the increase. Frozen food marketing is one these economic activities

Fish marketing has continued to accommodate more entrepreneurs as a result of increasing demand for the commodity. Due to inadequate supply of smoked and fresh local fish species from fishing centers like Idah, Ibaji and Ajaokuta local governments which are on the average 70 kilometers away, the town relies on frozen fish massively supplied from coastal cities like Lagos (about 654 kilometers away) and Port Harcourt (about 300 kilometers away) - the most common fish product in the market are the ones in frozen form. This has increased the amount of fish available for consumption and provided job opportunities for many. It is imperative for marketing participants to have a fair share of the margin in order to remain in business. It also important for consumers to have maximum satisfaction for the prices they pay for products consumed [9]. These conditions need to be fulfilled for the sustenance of the

market for a particular product. The market for frozen fish has to be sustained so as to make this relatively cheaper source of animal protein available for poor Nigerians, bearing in mind also the employment and the foreign exchange implications.

No systematic investigation has been conducted to reveal salient issues of economic importance surrounding the marketing, distribution and consumption of fish in this economically fast growing town where fish consumption and marketing have experienced considerable increase in the last 11 year since the establishment of Kogi State University. We therefore set out to conduct an economic investigation (in line with functional market analysis and consumption analysis approaches) of marketing and consumption of frozen fish in this town. Specifically, the following research objectives were sought. (a) to describe the socio-economic characteristics of the fish marketers and consumers; (b) to identify the distribution channel of frozen fish in the study area. (c) to determine the marketing margins and profitability of frozen fish marketing (d) to analyse the factors that determine the level of fish consumption and (e) identify the problems militating against the trade in frozen fish. We focus on the end of the marketing chain i.e. the segment where the retailers maintain direct contacts with the consumers.

## MATERIALS AND METHODS

### Study Area

Anyigba is a major metropolitan settlement in Dekina local government of Kogi State in central Nigeria. It is located between latitude $8^{0}43^{1}$ East and $9^{0}15^{1}$ West of the meridian and is about 120km east of Lokoja, the State capital. It has a warm humid climate with annual rainfall of 1,016mm to 1524mm and two main seasons, namely: the dry season, which lasts from November to February, and the rainy season, which last from March to October. During the rainy season, the daily mean temperature is $28^{o}$c, while in the dry season, the average temperature is $35^{o}$C.

Agriculture is the mainstay of the economy and provides employment for about 80% of the population. Major crops include yams, cassava, rice, sorghum, beans and maize. A good segment of the population is involved with, trade, artisanship and white-collar jobs. The town is the host of Kogi state university and has witnessed tremendous socioeconomic and infrastructural transformations since the establishment of the university.

### Sampling Procedure and Sources of Data

The data for this study are primary data collected from twenty (20) fish retailers who were randomly selected and sixty (60) randomly selected fish consumers in Anyigba metropolis with the aid of structured questionnaires. The data analysed include the socio economic characteristics of the two groups of respondents, the business characteristics of retailers, costs and prices involved in frozen food trade as well as the preference factor of the consumers.

### Method of Data Analysis

Data collected from respondents were displayed using descriptive statistics and analysed using market margin and regression analyses methods.

Market margin (MM): This is given by MM= retail price – wholesale price [9]. It gives the difference between retail price and the wholesale price. It can be presented in percentage as in [10] i.e

MM = Retail price-wholesale price/ Retail price X 100 which is equivalent to marketing margin as a percentage of the retail price.

Net margin (NM) gives the difference between the market margin and the marketing cost. It is given by NM=MM-MC where MC is the marketing cost including transportation cost, market association charges among others.

Gross margin was used to calculate the profit of the fish traders. Gross margin (GM) is given by GM = Total Revenue (TR) – Total variable Cost (TVC).

It is useful in profitability analysis of small scale enterprises where the fixed cost is negligible [11] as is the case with fish retailing business in rural Nigeria where all that is required is a set of operational material including a table and a knife arranged in most cases, in the open. Regression analysis was used to analyse the factors influencing the quantity of fish consumed by the respondents. The regression analysis employed in the study is specified as follows-

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + e_i \ldots\ldots\ldots 1$$

Where: Y= Level of fish consumption (naira)

$X_1$ = Amount of money spent on meat (amntonmt)

$X_2$ = Transportation cost (Tpcost)

$X_3$ = years of schooling (years of schooling)

$X_4$ = Price of fish in Naira (Price)

$X_5$ = Preference factor (preference)

$X_6$ = Household size

$X_7$ = Income in Naira (income)

$X_8$ = Age of household head (Age)

$e_i$ = error term, $\alpha$ = intercept and the $\beta_{is}$ represent the coefficients of the explanatory variables.

## RESULTS AND DISCUSSION

### Socio-Economic Characteristics of Frozen Fish Retailers

Table 1 presents the socio economic and operational characteristics of fish traders in Anyigba. The table shows that the retailing of frozen fish like other food stuff in Nigeria is almost entirely in the hands of the female folk. Most of traders were aged below 40 years of age, indicating that fish retailing was in the hands of an economically active segment of the population. Only 20% of the retailers possessed at least a secondary education suggesting that they were mostly uneducated. Most of the traders had between 1 and 10 years of experience in the business. Their decision to remain in the business for so long suggests that the trade is profitable. Majority of the traders interviewed relied on personal saving and assistance from relatives for their initial business capital. The level of patronage of the formal financial system in sourcing for business capital is low in the area. This is common place in the country and has impaired entrepreneurial development. Only 15% of the traders started their businesses with over 10,000 naira (150 naira = 1USD at the time the study) suggesting that one does not need too much money to venture into the business. It also shows that the level of investment is generally low.

**Table 1: Socio economic and operational Characteristics of fish retailers**

| | | |
|---|---|---|
| Sex | | |
| | Frequency | % |
| Female | 19 | 95.0 |
| Male | 1 | 5.0 |
| **Total** | **20** | **100.0** |
| Age (years) | | |
| Age | Frequency | % |
| < 20 | 4 | 20.0 |
| 21-30 | 10 | 50.0 |
| 31-40 | 5 | 25.0 |
| >40 | 1 | 5.0 |
| **Total** | **20** | **100.0** |
| Years of schooling | Frequency | % |
| 0 | 8 | 40.0 |
| 1-6 | 8 | 40.0 |
| 7-12 | 3 | 15.0 |
| >12 | 1 | 5.0 |
| **Total** | **20** | **100.0** |
| Fish trading experience | | |
| Years of experience | Frequency | % |
| 1-5 | 9 | 45.0 |
| 5-10 | 7 | 35.0 |
| >10 | 4 | 20.0 |
| **Total** | **20** | **100.0** |
| Source of business capital | | |
| Source | Frequency | % |
| Friends &relatives | 3 | 15.0 |
| Personal | 10 | 50.0 |
| Bank loans | 1 | 5.0 |
| Cooperative Loans | 6 | 30.0 |
| **Total** | **20** | **100.0** |
| Initial capital invested | | |
| (₦1000) | Frequency | % |
| 1-5 | 12 | 60.0 |
| 6-10 | 5 | 25.0 |
| 11-15 | 3 | 15.0 |
| Total | **20** | **100.0** |
| Mode of Transportation | Frequency | % |
| Own vehicle | 2 | 10.0 |
| Head portage | 6 | 30.0 |
| Commercial vehicles | 12 | 60.0 |
| Total | **20** | **100.0** |

**Source: Market survey, 2011**

The bulk of the traders used commercial vehicles for the transportation of the fish to and from the cold room and their display points. The common commercial mode of transportation is motorcycle. The transportation cost ranges between 40 - 60 naira depending on the size and weight of the load as well as distance. As revealed in the table, substantial percentage of the retailers also use head portage for transportation.

**Distribution Channel for Frozen Fish in the Study Area**

Figure 1 shows the distribution channel for frozen fish in the study area. There are five wholesalers in the town who obtain their supplies from the coastal cities of the country including Lagos and Port Harcourt every five days.

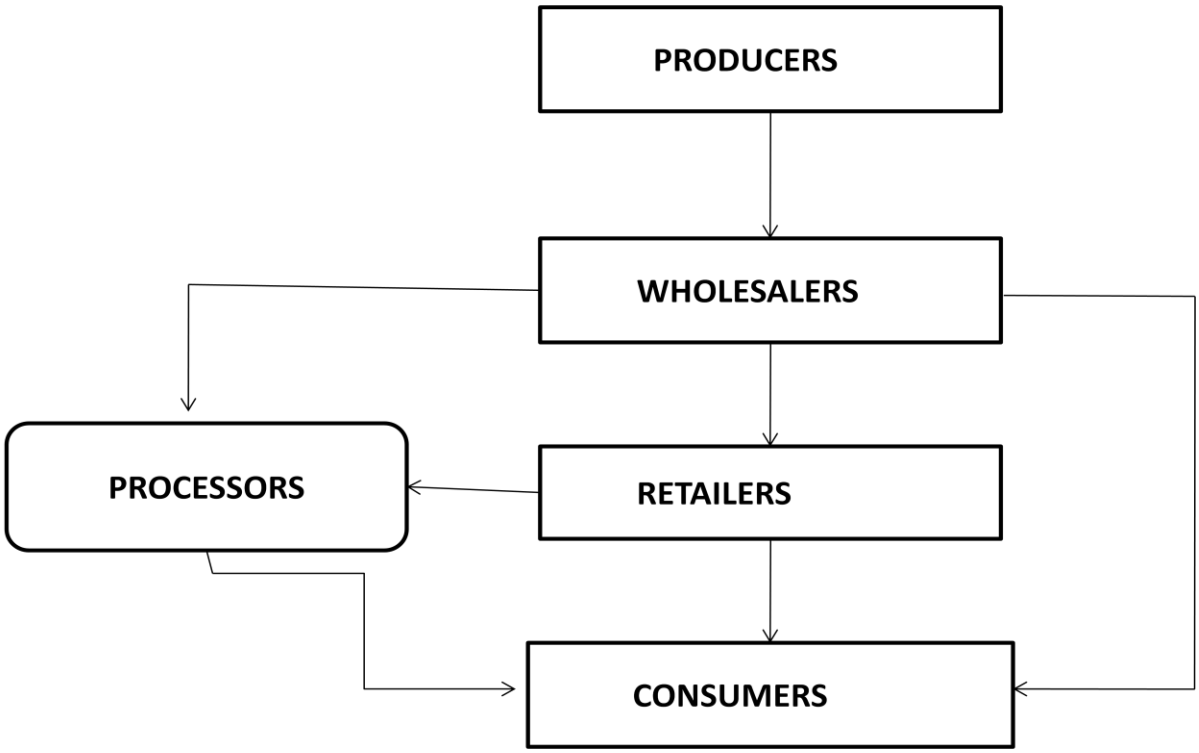


**Figure 1: Frozen fish distribution channel in Anyigba metropolis (Market Survey, 2011)**

These wholesalers who have their cold stores located in the central part of the town (near the central market) feed the numerous retailers and processors i.e. an average of 1 wholesaler to 15,745 people. The retailers are distributed throughout the town and can be accessible by a consumer within 5-10 minutes' walk. The retailers buy in cartons from the wholesalers and sell in pieces to the consumers. On the average, a retailer may sell 2 cartons in a day - on market days (which is every four day days) however, the rate of sales could double. Leftovers are returned to the cold rooms or sold to processors for smoking.

**Species of Fish Sold in Anyigba Area and Preferences**

The three frozen fish species sold in Anyigba are: *Scomber scombrus* popularly known as Titus, *Trachurus trachurus* locally known as Shawa and *Ethmalosa fimbriata* also known as Bonga fish. These species have been reported as highly commercial [12].

The species of frozen fish available in Anyigba and their preference by consumers are

shown in Table 2.

Table 2: Species of frozen Fish Sold in Anyigba and their Preference by Consumers

| Local Name | Scientific Name | Frequency | (%) |
|---|---|---|---|
| Titus | *Scomber scombrus* | 12 | 20 |
| Shawa | *Trachurus trachurus* | 11 | 18.3 |
| Bonga | *Ethmalosa fimbriata* | 27 | 61.7 |
| | **Total** | **60** | **100** |

**Source: Market survey, 2010**

Majority of respondents prefer the *Ethmalosa fimbriata* (Bonga fish) probably because it is cheaper than the other species. *Ethmalosa. fimbriata* is the most important clupeid species in the coastal Inshore waters of Nigeria whereas T. *trachurus* is fairly abundant, found on sandy bottom at 100-200 m depth [13]

**Market Margin Analysis**

The market margin analysis is presented in Table 3. It shows that the MM and NM are lowest for *E. fimbriata* and highest for *S. scombrus*. Titus which is the costliest (612.5 naira/Kg) is considered more prestigious in the area and appears to have found good patronage among the well-to- do frozen food consumers in the metropolis. Those not so privileged tend to consume shawa (382.42 naira/Kg) while the poorest of frozen fish consumers tend to settle for the Bonga fish (219.22 naira/Kg) which is the cheapest of the three.

**Table 3: Market Margin Analysis for the Three Species of Frozen Fish in Anyigba Metropolis**

| Parameters | *Ethmalosa fimbriata* (Bonga fish) | *Trachurus trachurus* (shawa) | *Scomber scombrus* (Titus) |
|---|---|---|---|
| Average Retail Price (RP) ₦ / carton of 20 kg | 4384.5 | 7648 | 12250 |
| Average wholesale price (WP) ₦ / carton of 20 kg | 3500 | 6500 | 10500 |
| Average marketing cost (MC) ₦ / carton of 20 kg | 78.2 | 78.2 | 78.2 |
| Marketing margin (MM) | 884.5 | 1148 | 1750 |
| Net margin (NM) | 806.3 | 1069.8 | 1671.8 |
| Net margin as % of (RP) | 18.4 | 14.00 | 13.7 |
| Net margin as % of (WP) | 23.04 | 16.45 | 15.9 |
| Net margin as % of (MC) | 1031.1 | 1368.03 | 2137.9 |
| Marketing margin as % of (RP) | 20.17 | 15.01 | 14.2 |
| Marketing margin as % of (WP) | 25.3 | 17.66 | 16.7 |
| Marketing margin as % of (MC) | 1131.7 | 1468.03 | 2237.9 |

**Source: Market survey, 2011**

When expressed in percentages of the average MC (the MC is the same for the 3 species), Titus had the highest NM and MM percentages (2137.9%, 2237.9%) while Bonga fish had the lowest (1031.1%, 1131.7%). That these margins are many times the MCs with these magnitudes is suggestive of an exploitative retailing business since marketing cost is supposed to reflect on the retail price with a justifiable profit margin [14]. The MM as percentages of the RPs are however lower than what was obtained by [10] but higher than those obtained by [9].

The percentages for the NM-RP, NM-WP, MM-RP and MM-WP ratios for the 3 species range from 13.65 to 25.3. These figures are higher than those obtained by [9]. These ratios reflect the rate of returns

for the margins. Since the numerators are the NM and MM while the denominators are the RP and WP, the rate of returns of the numerators relative to the denominators translate into earnings per unit naira of RP and WP invested in the retailing of frozen sea food in the study area.

**Profitability of Frozen Fish Retailing in the Study Area.**

The profitability analysis for frozen fish retailing is presented in Table 4. It shows that the average gross margin is 394,470 naira. This reveals that the trade is profitable in the area. On a per caput basis (using the national average family size of 6), this translates to 65,745 naira in a year.

**Table 4: Profitability Analysis for Fish Traders per Annum in the Study Area**

| | | |
|---|---|---|
| Total revenue | (₦) | 15,328,500.00 |
| Total variable cost | (₦) | 7,439,100.00 |
| Gross margin | (₦) | 7,889,400.00 |
| Gross margin/ trader | (₦) | 394,470.00 |

**Source: Market survey, 2011**

This is enough to keep an average fish trader and his/ her family members above the critical poverty line when compared with the 54,750 naira which is an equivalent of the amount needed to live above the critical poverty line of $1/day in a year.

**Socioeconomic Characteristics of Frozen Fish Consumers in the Study Area**

The socioeconomic characteristics of frozen fish consumers are presented in Table 5. It shows that most of the respondents were above 40 years of age. A little above half of the respondents belong in family with less than 6 persons. The level of education among consumers was high compared to that of the retailers. For instance 67.3% of the consumers have acquired at least a secondary education. Consumption of frozen fish is expected to increase with age and family size. This is because it is healthier for older people to consume fish than it is for them to consume the common types of meat available. A larger family size on the other hand may need more money to acquire sizeable and adequate quantity of chicken, beef, goat meat or wild game than an adequate quantity of fish would need.

Table 5: socioeconomic characteristics of frozen fish consumers in the study area

| **Age (Years)** | **Frequency** | **(%)** |
|---|---|---|
| 20 – 30 | 5 | 18.3 |
| 31 – 40 | 10 | 16.7 |
| 41 – 50 | 17 | 28.3 |
| 51 – 60 | 38 | 46.7 |
| **Total** | **60** | **100.0** |
| **Household** | | |
| 1 – 5 | 32 | 53.3 |
| 6 – 10 | 20 | 33.3 |
| 10 and Above | 8 | 13.4 |
| **Total** | **60** | **100.0** |
| **Education (years)** | | |
| 0 | 05 | 8.3 |
| 1-6 | 15 | 25.0 |
| 7-12 | 22 | 36.7 |
| Above 12 | 18 | 30.0 |
| **Total** | **60** | **100.0** |
| **Income (₦)/month** | | |
| <20,000 | 30 | 50.0 |
| 20,000 - 40,000 | 15 | 25.0 |
| 41,000 – 60,000 | 11 | 18.3 |
| Above 60,000 | 4 | 6.7 |
| **Total** | **60** | **100.0** |

**Source: Market survey, 2011**

As a result of income poverty which is high in rural Nigeria (over 70% of people in rural Nigeria are poor), family are likely to choose fish over meat. On a per month basis, half of the respondents earn below 20,000 naira which translates to 0.74$ per person per month on the basis of the national average house hold size.

**Factors that Determine the Levels of Fish Consumption**

The factors that determine the levels of fish consumption are shown in Table 6. The coefficient of determination ($R^2$) value of 0.5186 implies that 51.86% of the variation in the rate of fish consumption is accounted by the independent variables (amount spent on meat, transportation cost, education, price of meat, preference, household size, income and age). As expected, price of frozen fish negatively affected the rate of fish consumption and this relationship is significant at 1% level of probability. Household size had significant positive effect on the quantity of fish consumed at 10% level of probability. Income also has a negative effect on the rate of fish consumption and it is significant at 10% level of probability implying that an increase in the consumer income decreases level of frozen fish consumption.

**Table 6: Determinants of Level of Frozen Fish Consumption**

| | Coefficient | t | Significance |
|---|---|---|---|
| Constant | -2155.328 | -2.28 | 0.027 |
| amntonmt | -0.0192909 | -0.40 | 0.688 |
| Tpcost | -0.5024357 | -0.08 | 0.938 |
| years of schooling | 34.38934 | 0.50 | 0.622 |
| Price | -4.954217 | -2.74 | 0.008** |
| Preference | 184.8163 | 0.91 | 0.369 |
| Household Size | 115.1845 | 1.78 | 0.080* |
| Income | - 0.0182809 | 1.92 | 0.060* |
| Age | 33.71847 | 1.02 | 0.314 |

$R^2$ = 0.5186, Adjusted $R^2$ = 0.4431, *Significant at 10% level of probability, **Significant at 5% level of probability.

**Source: Computation from market survey, 2011**

This is not a strange revelation as Nigerians tend to consume the common species of fish only as a cheaper alternatives to the more desirable but expensive animal protein sources such as turkey, chicken, beef, pork, goat meat and wild game.

**Problems Confronting Frozen Fish Trade in the Study Area**

Table 7 shows that the most prevalent problems confronting fish traders in the area are those of unstable power supply. This is common place in Nigeria where entrepreneurs have to rely on privately owned diesel powered generating sets.

**Table 7: Problems of Frozen Fish Marketing in the Study Area**

| **Problems** | **Frequency** | **(%)** |
|---|---|---|
| Unstable Power Supply | 8 | 40 |
| High Storage Cost | 6 | 30 |
| Poor Road Network | 4 | 20 |
| Delay in Supply | 2 | 10 |
| **Total** | **20** | **100** |

**Source: Field survey, 2011**

The burden of this problem which is majorly that of the wholesalers is transferred through the retailers - via the medium of high overhead cost, e.g. high storage cost- to the consumers.

## CONCLUSION AND RECOMMENDATIONS

The study found that fish marketing is largely in the hands of young women most of whom were largely uneducated. Retailing of fish was found to be a profitable business venture capable of keeping the traders above the critical poverty line. Also, most consumers preferred *Ethmalosa fimbriata* (bonga fish) on account of it low price. Factors such as amount spent on meat, price, income and transportation costs are negatively related to the level of fish consumption while education level, family size and age are positively correlated with fish consumption. Patronage of Fish in the area promises to be high judging from the profitability level of the trade. Marketing margins also reflect a good motivation for continuity in the business. The consumption of frozen food generally, and specifically - as judged by the preference factor- was price elastic in the fashion of normal goods. But the trade is not without its major problems. Some of these problems include poor power supply, poor road network delayed supplies. In order to make trading of fish more profitable for traders and make cheap protein more affordable by consumers, the provision of stable power supply so that power should be available for the operation of the cold room, improved road network to enhance transportation; encouragement of adult education so as to increase effectiveness of trade for trader and encourage consumption by consumers; increase in awareness campaign on the health and nutritional benefits of fish consumption and introduction of other species of fish in the markets in order to increase specie varieties, consumer choices especially as it concerns pricing and expand fish marketing business are recommended.

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